BIOTIC COMMUNITIES

Fish Community Data

Sixty species of fish have been collected by various investigators in the Grand River Basin since 1963 (Table 9, Figure fs) An additional 16 species have distributions that overlap portions of the basin (Pflieger 1971, 1975), but have not been collected. Common species within the basin are channel catfish (*Ictalurus punctatus*), black bullhead (*Ameiurus melas*), yellow bullhead (*A. natalis*), common carp (*Cyprinus carpio*), river carpsucker (*Carpiodes carpio*), creek chub (*Semotilus atromaculatus*), red shiner (*Cyprinella lutrensis*), sand shiner (*Notropis stramineus*) and green sunfish (*Lepomis cyanellus*). Grand River historically had a diverse fish population. An early naturalist reported catching "great numbers of interesting specimens...Grand River is the first stream we have seen in Missouri that is tolerably well supplied with fish" (Hoy 1872). Catfish are the most important sportfish within the basin. An estimated 72,920 catfish and bullheads were caught in Grand River in 1975 (Fleener 1977). Missouri River tributaries such as the Grand River are probably important spawning and nursery areas for big river catfish (Coon and Dames 1989; Brown and Coon 1994). A flathead catfish tagged in the Missouri River near Columbia, Missouri was captured in Grand River near Gallatin.

Channel Catfish

Grand River

Channel catfish (*Ictalurus punctatus*) are the most popular sportfish within the basin. Limited sampling has been done to assess channel catfish populations. Samples have generally been restricted to the upper Grand River and a few major tributaries. The majority of channel catfish collected were less than 11 inches long. Proportional stock density (PSD ₁₆) values ranged from 13 to 35. No channel catfish longer than 24 inches were collected. Channel catfish made up 21% of the 1979 fish sample. Age 4 fish averaged 10.6 inches long. This is average when compared with statewide data (Purkett 1958).

Grindstone, Big (Daviess County), and Shoal creeks are major tributaries to Grand River that have been electrofished. Grindstone and Big creeks have quality channel catfish populations.

Thompson River

Paragamian (1990) collected fish population information from major streams throughout Iowa. Two of his study sites were on the upper Thompson River. Rotenone samples from upper Thompson River produced length frequency histograms similar to the upper Grand River electofishing samples. No fish longer than 20 inches were collected. Age 4 fish averaged 10.5 inches and 10.9 inches at the two sample sites. Density estimates were 4,402 and 721 fish/ha-hectare (Paragamian 1990).

Electrofishing Missouri's channelized portion of the river resulted in a length frequency histogram dominated by fish less than 11 inches long. The PSD_{16} value was 12. No fish longer than 24 inches were captured. Conversations with local conservation agents indicates this is similar to angler catches.

Few large channel catfish are observed during routine resource user contacts.

Flathead Catfish

Flathead catfish (*Pylodictus olivaris*) is another popular sport fish species. Many of the major streams and tributaries contain flatheads; however, most of the larger fish (>10 pounds) are caught from Grand River. An occasional large flathead is caught from the Thompson River, Weldon River and other tributaries, but these are uncommon.

Sampling in Grand River during 1976 (Gentry County) and 1979 (Daviess County) indicated good number of flatheads. The Gentry County sample was made up mostly of fish less than 16 inches long. The PSD₁₆ value was 23 and the Relative Stock Density (RSD₂₄) value was 8. The Daviess County sample indicates there was a higher quality flathead population. The PSD₁₆ and RSD₂₄ values were 49 and 22, respectively. Age 4 fish averaged 17.2 inches long.

Very little sampling has been done in the Grand River below Chillicothe. Anecdotal evidence suggests that the lower Grand River contains more large flathead catfish than the Daviess or Gentry county sites.

Blue Catfish

Blue catfish (*Ictalurus furcatus*) (locally known as white catfish) are a prized fish in the basin. Every year anglers catch a few fish more than 30 pounds. Pflieger (1975) reported an 1854 account of a blue catfish weighing 136 pounds caught from Grand River near Chillicothe. Information on this species in the Grand River Basin is virtually non-existent. Blue catfish had never been sampled by MDC management personnel in the Grand River Basin before 1994.

Aquatic Invertebrates

Mussels

Freshwater mussels have nearly disappeared from many streams in northwestern and north central Missouri over the last fifty years (Oesch 1984). A 1913 survey indicated the Grand River had a considerable number of shells that were of commercial value (Oesch 1984). Today, mussels are drastically reduced in Grand River due to pollution from agricultural chemicals and sedimentation.

Websites: http://www.conservation.state.mo.us/conmag/1996/jul/2.html

http://www.conservation.state.mo.us/conmag/1996/feb/fe96barn.html

According to Oesch (1984) 19 species of freshwater mussels have historically occurred in the Grand River Basin (Table 10). Eleven of those species are found in the Grindstone Creek sub-basin. While mussels are sparse within the basin, none of the species sampled are listed as threatened or endangered (A. Buchanan, MDC, personal communication).

A formal survey of Locust Creek revealed that flat floaters (*Anodonta suborbiculata*) were collected for the first time in the Prairie-Upper Missouri Aquatic Faunal Division in 1998. Flat floaters are state listed as rare. They were collected in two locations within the basin (Winston et al, 1998).

Insects

Some invertebrate collections have been made. Most have been associated with USDA-SCS watershed planning projects. (Kangas and Crawford 1977, Mid-MO Engineers 1980, Rowe 1979). Eder also did some limited sampling at seven sample sites on the Grand and Thompson rivers. Locust Creek was sampled at the Locust Creek C.A. in a cooperative agreement with MDC and the Missouri Cooperative Fish and Wildlife Research Unit (Fantz 1993). Insects of 18 orders and 71 families have been collected since 1977 (Table 11).

Crayfish

Five species of crayfish have been collected within the Grand River basin (Pflieger, MDC, personal communication). The species which have been collected in order of abundance are the northern crayfish (*Orconectes virilis*), papershell crayfish (*O.immunis*), devil crayfish (*Cambarus diogenes*), grassland crayfish (*Procambarusgracilis*) and the White River crayfish (*P. acutus*).

Website: http://www.conservation.state.mo.us/nathis/arthopo/crayfish/crayfish.htm

Threatened and Endangered Species

Website: http://www.conservation.state.mo.us/nathis/endangered/index.htm

The threatened and endangered fish species in the Grand River Basin are listed in Table 12. Of particular concern is the Topeka shiner because it is a good indicator of high quality habitat of prairie creeks (Pflieger 1990) This species is experiencing a dramatic decline in population over its entire range (Tabor 1993).

Paddlefish, mooneye and blue sucker are basically large river species. Capture records of these species indicate their presence being restricted primarily to the mainstem of the Grand River. The distribution of all three species has been documented in the lower Grand River to Gallatin, Daviess County, MO (river mile 0-88). Additional collections of paddlefish have been made upstream in the Grand River in Gentry County, MO. Mooneye have been collected in the Weldon River near Princeton, Mercer County, MO. One conservation agent reports that paddlefish are caught in the Weldon River as far upstream as Princeton, MO.

Topeka shiners are found in high quality stream reaches that have not been degraded by extensive channelization or heavy sedimentation. "We learned of the presence of the Topeka shiner in Harrison County only because a student sampled many small streams of this county as part of a thesis project in 1963. There has never been a systematic survey of small streams in most other counties of the Grand River system, and such a survey might have the best potential for the discovery of additional Missouri

populations of *N. topeka*" (Pflieger, personal communication). Recent Topeka shiner collections have come from the remaining high quality streams in Daviess, Grundy and Harrison counties in Missouri. A systematic fish survey of the Grand River Basin or at least a fish survey of potential occurrence sites of Topeka shiner would be beneficial in documenting the current distribution of this species in the basin.

Websites: http://www.conservation.state.mo.us/conmag/1999/02/4.html

http://www.conservation.state.mo.us/news/out/1999/012999.html

Trout-perch are typically found in deeper pools in small streams within the Grand River Basin. Trout-perch are "widespread in the Grand and Chariton stream systems..." (Pflieger 1971), but only rarely abundant at any fish sample site. Seven of the ten fish collections listed in Table 9 had trout-perch represented. A systematic fish survey of Topeka shiner localities would help in delineating the range of the trout-perch since these fish species often occur together.

A pallid sturgeon was caught by an angler on May 10, 1998 from the Grand River at the Chillicothe Access. The fish was one of 24 tagged and released into the Missouri River at river mile 299 on July 24, 1997.

Fish Stockings

Stocking of both native and non-native species has been a fisheries management tool in lakes and streams throughout the basin. Minutes of the Cameron Hunting and Fishing Club report that the Missouri Conservation Commission stocked 35,000 channel catfish and 5,000 largemouth bass in Shoal Creek during July, 1942. No information regarding lengths of those fish is available. Undoubtedly, unreported stocking by private individuals has also occurred. Two smallmouth bass were sampled from Shoal Creek in 1973 (O. Fajen, MDC, unpublished data). No other observations of this species have been noted from streams within the basin.

The most intensive stream stocking program was an effort to establish spotted bass fisheries in several north Missouri streams. Over 25,000 spotted bass were stocked in the Grand River Basin from 1965-1971 (Fajen 1975). Table 13 indicates the streams where the fish were stocked. Recent collections (since 1988) indicate that self sustaining populations are located in Grindstone, Big and Marrowbone creeks. Spotted bass were never stocked in Marrowbone Creek by MDC personnel.

Escapement of walleye (*Stizostedion vitreum*) and saugeye (*S. vitreum*) X (*S. canadense*) from several Iowa reservoirs contributes to the stream sport fishery. Limited fisheries exist downstream of these lakes. In Missouri, walleye are occasionally captured in the Weldon Fork and Thompson River. A locally popular walleye fishery exists in West Muddy Creek immediately downstream of Lake Paho near Princeton, Missouri.

Most public lakes in Missouri are supplementally stocked with channel catfish annually. Escapement of

these fish into basin streams varies and may be locally significant but overall is probably negligible. In 1985, channel catfish (n=2,885) were tagged before stocking into Lake Paho to document spillway losses. As of April 1999, all tag returns (n=59) have come from the main lake. Numerous channel catfish are captured in West Muddy Creek. The fish may be coming from the Lake Paho Fish Rearing Station below Lake Paho and adjacent to the stream.

Flathead catfish were captured from the Missouri River near St. Joseph and stocked into King Lake in 1986. Five years later, one of the tagged fish was recaptured in the Missouri River near Nebraska City, Nebraska (NE). The fish traveled more than 400 miles through Lost Creek, Grindstone Creek, Grand River and the Missouri River.

Redear sunfish (*Lepomis microlophus*) have been stocked in many public lakes. Common carp (*Cyprinus carpio*) are an exotic species which have become well established throughout the basin. Various Asian carps are also becoming established. Grass carp (*Ctenopharyngodon idella*) have been stocked widely throughout the basin to control aquatic vegetation. In April 1994, an angler caught a bighead carp (*Hypophthalmichthys nobilis*) in Grand River from a borrow ditch near Chillicothe, first documented capture of this species in the basin. Another angler caught a pallid sturgeon (*Scaphirhynchus albus*) on Grand River at Chillicothe. The fish was stocked in the Missouri River at Waverly.

Muskellunge (*Esox masquinongy*) and blue catfish have been stocked in Pony Express Lake. Chances of these fish impacting stream fish communities are minimal. Plans include stocking walleye fingerlings into Grand River in June of 2000.

Creel Survey Data

Access point creel surveys were conducted in 1975 to determine recreational use of the Grand River (Fleener 1977). Anglers spent 69,000 hours (17,250 days) fishing on the upper Grand River (above Gallatin), and 198,700 hours (49,675 days) on the lower Grand River (below Chillicothe). Anglers harvested an estimated 267,700 fish (Table 14).

A statewide telephone survey conducted between 1983-1986 estimated that angler effort on Grand River ranged from 12,957 days/year to 74,357 days/year (Weithman 1987).

Table 9. List of all fish species sampled in the Grand River Basin (1963-present).

| Common Name | Scientific Name |
|--------------------------------|----------------------------|
| Pallid sturgeon (angler catch) | Scaphirhynchus albus |
| Shovelnose sturgeon | S. platorynchus |
| Paddlefish | Polyodon spathula |
| Longnose gar | Lepisosteus osseus |
| Shortnose gar | L. platostomus |
| Goldeye | Hiodon alosoides |
| Mooneye | H. tergisus |
| American eel | Anguilla rostrata |
| Gizzard shad | Dorosoma cepedianum |
| Central stoneroller | Campostoma pullum |
| Goldfish | Carassius auratus |
| Grass carp | Ctenopharyngodon idella |
| Red shiner | Cyprinella lutrensis |
| Common carp | Cyprinus carpio |
| Western silvery minnow | Hybognathus argyritis |
| Plains minnow | H. placitus |
| Bighead carp (angler catch) | Hypophthalmichthys nobilis |
| Redfin shiner | Lythrurus umbratilis |
| Speckled chub | Macrhybopsis aestivalis |
| Silver chub | M. storeriana |
| Golden shiner | Notemigonus crysoleucas |
| Emerald shiner | Notropis atherinoides |
| Bigmouth shiner | N. dorsalis |
| Sand shiner | N. ludibundus |

Table 9 continued

| Topeka shiner | N. topeka |
|-----------------------|-------------------------|
| Suckermouth minnow | Phenacobius mirabilis |
| Bluntnose minnow | Pimephales notatus |
| Fathead minnow | P. promelas |
| Creek chub | Semotilus atromaculatus |
| River carpsucker | Carpiodes carpio |
| Quillback | C. cyprinus |
| White sucker | Catostomus commersoni |
| Blue sucker | Cycleptus elongatus |
| Smallmouth buffalo | Ictiobus bubalus |
| Bigmouth buffalo | I. cyprinellus |
| Black buffalo | I. niger |
| Golden redhorse | Moxostoma erythrurum |
| Shorthead redhorse | M. macrolepidotum |
| Black bullhead | Ameiurus melas |
| Yellow bullhead | A. natalis |
| Blue catfish | Ictalurus furcatus |
| Channel catfish | I. punctatus |
| Stonecat | Noturus flavus |
| Tadpole madtom | N. gyrinus |
| Flathead catfish | Pylodictis olivaris |
| Northern Pike | Esox lucius |
| Trout-perch | Percopsis omiscomaycus |
| White bass | Morone chrysops |
| Green sunfish | Lepomis cyanellus |
| Orangespotted sunfish | L. humilis |
| Bluegill | L. macrochirus |

Table 9 continued

| Smallmouth bass | Micropterus dolomieu |
|-----------------|------------------------|
| Spotted bass | M. punctulatus |
| Largemouth bass | M. salmoides |
| White crappie | Pomoxis annularis |
| Black crappie | P. nigromaculatus |
| Johnny darter | Etheostoma nigrum |
| Sauger | Stizostedion canadense |
| Walleye | S. vitreum |
| Freshwater drum | Aplodinotus grunniens |

Collectors

R.G. White (1963)

R. Green (1969)

W. L. Pflieger (1971), Missouri Department of Conservation (MDC)

O. Fagen (1973), MDC, unpublished data

D.A. Kangus and R.A. Crawford (1977)

J.R. Rowe (1979)

Mid-Missouri Engineers (1980)

V. Paragamian (1987)

L. Schrader (1989), MDC, unpublished data

L. S. Eder, (1976-1989), MDC, unpublished data

B. L. Todd, et.al. (1994)

Greg Pitchford, (1992-present), MDC, unpublished data

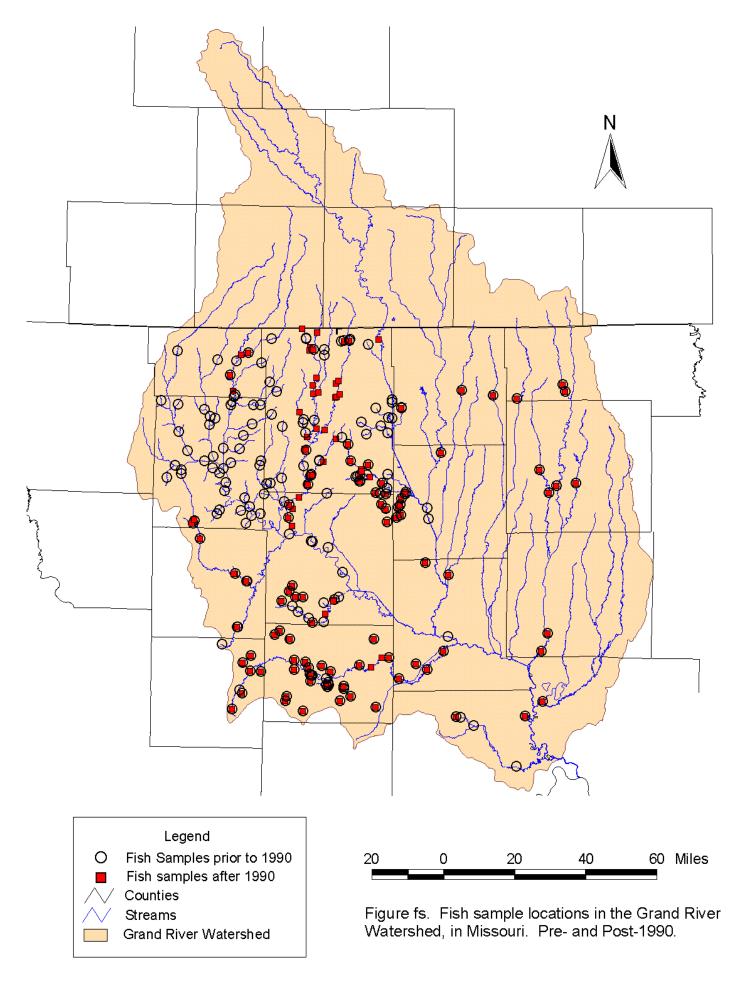


Table 10. List of the freshwater mussel species collected from the Grand River Basin according to Oesch (1984).*

| Common Name | Scientific Name | Collection Date |
|---------------------|-----------------------|-----------------|
| Giant floater | Anodonta grandis sp. | After 1965 |
| Squaw foot | Strophitus undulatus | Before 1920 |
| White heel-splitter | Lasmigona complanata | After 1965 |
| Washboard | Megalonaias nervosa | Before 1920 |
| Pistol-grip | Tritogonia verrucosa | Before 1920 |
| Maple leaf | Quadrula quadrula | After 1965 |
| Pimple-back | Q. pustulosa | After 1965 |
| Monkey-face | Q. metanevra | Before 1920 |
| Three-ridge | Amblema plicata | After 1965 |
| Wabash pig-toe | Fusconaia flava | After 1965 |
| Pond-horn | Uniomerus tetralasmus | After 1965 |
| Deer-toe | Truncilla truncata | After 1965 |
| Fragile paper shell | Leptodea fragilis | After 1965 |
| Pink heel-splitter | Potamilus alatus | Before 1920 |
| Pink paper shell | P. ohioensis | Before 1920 |
| Pond mussel | Ligumia subrostrata | After 1965 |
| Slough sand-shell | Lampsilis teres ssp. | Before 1920 |
| Yellow sand-shell | L. teres ssp. | After 1965 |
| Pocketbook | L. ventricosa | Before 1920 |

^{*} Does not include the Flat floater (Anodonta suborbiculata) collected in 1998.

Table 11. Invertebrate collections from the Grand River Basin.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------|---|---|---|---|---|---|---|---|
| TRICHOPTERA | | | | | | | | |
| Hydropsychidae | | | | | | | | |
| Cheumatopsyche sp. | X | X | | X | X | | X | |
| Hydropsyche sp. | X | X | X | X | | | X | X |
| Potamyia sp. | X | X | | | | | X | |
| Hydroptilidae | | | | | | | | |
| Leucotrichia sp. | | | | | | | X | |
| Leptoceridae | | | | | | | | |
| Leptocella sp. | | | X | | | | | |
| Philopotamidae | | | | | | | | |
| Chimarra | | | | | | | | X |
| Polycentropodidae | X | | | | | | | |
| Neureclipsis sp. | X | | | | | | | |
| Psychomyiidae | | | | | | | | |
| Psychomyia sp. | | | | | | | X | |
| EPHEMEROPTERA | | | | | | | | |
| Baetidae | | | X | | | | | |
| Baetis sp. | X | X | | | | | X | X |
| Paracloedes sp. | | | | | | | X | |
| Caenidae | | | | | | | | |
| Caenis sp. | X | X | X | X | X | X | X | X |
| Ephemeridae | | | | | | | | |
| Hexagenia sp. | X | X | X | X | X | X | X | X |
| Heptageniidae | | | | | | | | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------|---|---|---|---|---|---|---|---|
| Stenonema sp. | X | X | | X | | X | X | X |
| Heptagenia sp. | X | | | X | X | | X | |
| Anepeorus sp. | | | X | | | | | |
| Leptophlebiidae | | | | | | | | |
| Paraleptophlebia sp. | | | | | | | X | |
| Oligoneuriidae | | | | | | | | |
| Isonychia sp. | X | X | X | X | | | | X |
| Palingeniidae | | | | | | | | |
| Pentagenia sp. | X | | | | | | | |
| Polymitarcyidae | | | | | | | | |
| Ephoron sp. | X | X | | | | | | |
| Siplonuridae | | | | | | | | |
| Ameletus sp. | | | | X | X | | | |
| Tricorythodidae | | | | | | | | |
| Tricorythodes sp. | X | X | | | | | | |
| PLECOPTERA | | | | | | | | |
| Capriidae | | | | | | | | |
| Allocapnia sp. | | | | | | | X | |
| Perlidae | | | | | | | | |
| Acroneuria sp. | | | | X | X | | X | |
| Neoperla sp. | X | X | | | | | | |
| Perlesta sp. | X | X | | | | | X | |
| Taeniopterygidae | | | | | | | | |
| Taeniopteryx sp. | | | | | | | X | |
| ODONATA | | | | | | | | |
| Aeshnidae | | | | | | | | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------|---|---|---|---|---|---|---|---|
| Epiaeschna sp. | | | | X | | | | |
| Calopterygidae | | | | | | | | |
| Hetaerina sp. | X | X | | | | | | |
| Calopteryx | X | | X | | | | X | |
| Coenagrionidae | | | | | | | | |
| Amphiagrion sp. | | | | X | X | | X | |
| Chromagrion sp. | | | | X | | | | |
| Enallagma sp. | | | X | X | X | | | |
| Ischnura sp. | | | X | X | X | | X | |
| Protallagma | | | | | | | | X |
| Corduliidae | | | | | | | | |
| Somatochlora sp. | | | | | X | | X | |
| Gomphidae | | | | | | | | |
| Gomphus sp. | X | X | X | | X | X | X | X |
| Dromogomphus sp. | X | | | X | X | | | |
| Progomphus sp. | | | X | | | | X | |
| Lestidae | | | | | | | | |
| Lestes sp. | | | X | | | X | X | |
| Libellulidae | | | | | | | | |
| Brachymesia sp. | | | | | | X | | |
| Plathemis sp. | | | | | X | | | |
| Macromiidae | | | | | | | | |
| Macromia sp. | X | | X | | | X | X | |
| Tramea sp. | | | X | | | | | |
| Protoneuridae | | | | | | | | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------|---|---|---|---|---|---|---|---|
| Argia sp. | X | X | X | | | X | X | |
| COLEOPTERA | | | | | X | | | |
| Chrysomelidae | | | X | | | | | |
| Dryopidae | | | | | | | | |
| Helichus sp. | | | | X | X | | X | |
| Dytiscidae | | | X | | | | | |
| Agabus sp. | | | | | X | | X | |
| Copelatus sp. | | | | | X | | X | |
| Dytiscus sp. | | | | | | | X | X |
| Hydroporus sp. | | | | | X | | | |
| Laccophilus sp. | | | | | X | X | X | |
| Thermonectus sp. | | | | | X | | | |
| Elmidae | | | | | | | | |
| Ancyronyx sp. | | | | X | | | | |
| Stenelmis sp. | X | X | X | | | | X | X |
| Dubiraphia sp. | X | X | X | | X | | | |
| Optioservus sp. | X | X | | | | | | |
| Gyrinidae | | | X | | | | | |
| Dineutus sp. | | X | | | | | X | |
| Gyrinus sp. | | | | | | | X | |
| Haliplidae | | | | | | | | |
| Haliplus sp. | | | X | | | | | |
| Peltodytes sp. | | | | | X | X | X | |
| Hydrophilidae | | | | | | | | |
| Enochrus sp. | | | | | | | X | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------|---|---|---|---|---|---|---|---|
| Helophorus sp. | | | | | | X | X | |
| Hydrochus sp. | | | | | | | X | |
| Hydrophilus sp. | | | | | | | X | |
| Sphaeridium sp. | | | X | | | | | |
| Tropisternus sp. | | | X | | X | | X | |
| Noteridae | | | | | | | | |
| Notomicrus | | | | | | | | X |
| Scirtidae (Helodidae) | | | X | | | | | |
| Cyphon sp. | | | | | | X | X | |
| Staphylinidae | | | | | | | | X |
| MEGALOPTERA | | | | | | | | |
| Corydalidae | | | | | | | | |
| Corydalus sp. | X | X | | | | | X | |
| Chauliodes sp. | | | X | | | | | |
| Sialidae | | | | | | | | |
| Sialis sp. | | X | X | | | | | X |
| HEMIPTERA | | | | | | | | |
| Belostomidae | | | | | | | | |
| Belostoma sp. | | | X | | | | | |
| Lethocerus sp. | | | | | | X | X | |
| Corixidae | X | | X | | | | | |
| Sigara sp. | | | | | | X | X | |
| Trichocorixa sp. | | | | | X | | X | |
| Gerridae | | | | | | | | |
| Gerris sp. | | | | X | X | | X | |
| Rheumatobates sp. | | | | X | X | | | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------|---|---|---|---|---|---|---|---|
| Hebridae | | | | | | | | |
| Naeogus sp. | | | | X | | | | |
| Hydrometridae | | | | | | | | |
| Hydrometra sp. | | | | | X | | | |
| Mesoveliidae | | | | | | | | |
| Mesovelia sp. | | | | X | | | | |
| Nepidae | | | | | | | | |
| Ranatra sp. | | | X | | | | X | |
| Ranatra sp. | | | | X | X | | | |
| Notonectidae | | | | | | | | |
| Buenoa sp. | | | X | | | | | |
| Veliidae | | | | | | | | |
| Rhagovelia sp. | X | | X | | | | X | |
| DIPTERA | | | | | | | | |
| Ceratopogonidae (Heleidae) | | | X | | | | | |
| Bezzia sp. | | | | | | X | | |
| Culicoides sp. | | | | | X | | | |
| Stilobezzia sp. | | | | | X | | | |
| Chironomidae | X | X | | X | X | | | X |
| Chironomus sp. | | | | X | X | X | X | |
| Cryptochironomus sp. | | | | | X | | | |
| Dicrotendipes sp. | | | | | X | X | X | |
| Glyptotendipes sp. | | | | X | X | | X | |
| Micropsectra sp. | | | | | X | X | X | |
| Microtendipes sp. | | | | | | X | X | |
| Parachironomus sp. | | | | | | | X | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------|---|---|---|---|---|---|---|---|
| Pentaneura sp. | | | X | | | X | X | |
| Polypedilum sp. | X | X | | | | | X | |
| Procladius sp. | | | | X | X | | | |
| Pseudochrionomus sp. | | | | | | | X | |
| Rheotanytarsus sp. | | | | X | | | X | |
| Tanypus sp. | | | | X | X | | | |
| Culicidae | | | | | | | | X |
| Anopheles sp. | | | | | X | X | X | |
| Chaoborus sp. | | | | | X | | | |
| Empididae | | | | | | | | |
| Hemerodromia sp. | X | X | | | | | | |
| Ephydridae | | | X | | | | | |
| Dichaeta sp. | | | | X | | | | |
| Simuliidae | X | X | | | | | | |
| Simulium sp. | | | X | X | X | | X | X |
| Stratiomyiidae | | | | | | | | |
| Stratiomyia sp. | | | | | X | | | |
| Tabanidae | | | X | | | | | |
| Tabanus sp. | | | | | | | X | |
| Tipulidae | X | | | | | | | |
| Erioptera sp. | | | X | | | | | |
| Pedicia | | | | | | | | X |
| Tipula | | | X | | | X | X | |
| AMPHIPODA | | | | | | | | X |
| Gammaridae | | | | | | | | |
| Gammarus sp. | | | | | | X | X | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------|---|---|---|---|---|---|---|---|
| Talitridae | | | | | | | | |
| Hyalella sp. | | | X | X | X | | | |
| DECAPODA | | | | | | | | |
| Astacidae | | | | | | | | |
| Orconectes sp. | | | | X | X | | | |
| Orconectes sp. | | | X | X | X | | | |
| Orconectes virilis | X | X | | X | X | | | |
| Procambarus sp. | | | | X | | | | |
| ISOPODA | | | | | | | | |
| Asellidae | | | | | | | | |
| Asellus sp. | | | | | | X | X | |
| OLIGOCHAETA | | | | | | X | X | X |
| Tubificidae | | X | | | X | | | |
| Limnodrilus sp. | | | X | X | X | | | |
| Branchiobdellidae | | | | | | | | |
| Branchiobdella sp. | | | | X | X | | | |
| HIRUDNEA | X | | | | | X | X | |
| Erpobdellidae | | | | | | | | |
| Erpobdella sp. | | | X | | | | | |
| Glossiphonidae | | | X | | | | | |
| Helobdella sp. | | | | X | X | | | |
| Placobdella sp | | | | | X | | | |
| TRICLADIDA | | | | | | | | |
| Planariidae | | | | | | | | |
| Curtisia sp. | | | X | | | | | |
| PULMONATA | | | | | | | | |

Table 11 continued

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------|---|---|---|---|---|---|---|---|
| Ancylidae | | | | | | | | |
| Ferrissia sp. | | | X | X | | | | |
| Lymnaeidae | | | | | | | | |
| Lymnaea sp. | | | | | X | | | |
| Physidae | | | | | | | | |
| Physa sp. | | | X | | X | X | X | |
| Physa integra | | | | X | X | | | |
| Planorbidae | | | | | | | | |
| Gyralaus sp. | | | | | | | X | |
| Helisoma sp. | | | X | | | | | |
| HETERODONTA | | | | | | | | |
| Sphaeriidae | | | | | | | | |
| Musculium sp. | | | X | | | | | |
| Sphaerium sp. | | | X | X | X | X | X | |
| EULAMELLIBRANCHIA | | | | | | | | |
| Unionidae | | | X | | | | | |
| Anodonta sp. | | | | X | | | | |
| Anodontoides sp. | | | | X | | | | |
| GORDIIDA | | | | | | | | |
| Gordiidae | | | | | | | | |
| Gordius sp. | | | X | | | | X | |

| Collection # | Location | County | Collector |
|--------------|----------------|--------|------------|
| 1 | Grand River | | Eder, 1988 |
| 2 | Thompson River | | Eder, 1988 |

Table 11 continued

| Collection # | Location | County | Collector |
|--------------|------------------|--------------|------------------------|
| 3 | Big Creek | Harrison Co. | Kangas, 1977 |
| 4 | Grindstone Creek | | Rowe, 1979 |
| 5 | Lost Creek | | Rowe, 1979 |
| 6 | Hurricane Creek | | Mid-MO Engineers, 1980 |
| 7 | Big Creek | Carroll Co. | Mid-MO Engineers, 1980 |
| 8 | Locust Creek | | Fantz, 1993 |

Table 12. List of the threatened and endangered fish species in the Grand River Basin* (MDC 1991). * No fish species that occur in the Iowa portion of the Grand River Basin are state listed as threatened or endangered.

| Species | Missouri Status | Federal Status | |
|-----------------|-----------------|----------------|--|
| Paddlefish | Watch List | | |
| Mooneye | Rare | | |
| Topeka shiner | Endangered | Endangered | |
| Blue sucker | Watch List | C2 | |
| Trout-perch | Rare | | |
| Pallid Sturgeon | Endangered | Endangered | |

Table 13. List of the recent fish stockings within the Grand River Basin, except channel catfish.

| Location | Sub-basin | Species |
|--------------------------|---------------------|----------------------------|
| Twelve Mile Lake (Iowa) | Upper Thompson | Walleye, Saugeye |
| Little River Lake (Iowa) | Upper Weldon | Walleye, Saugeye |
| Sun Valley Lake (Iowa) | Middle Thompson | Walleye |
| Loch Ayr (Iowa) | Upper Grand | Saugeye |
| Lake Paho | Lower Weldon | Walleye, Brook silversides |
| Pony Express Lake | Lost Creek | Muskellunge, Blue catfish |
| Che-Ru Lake | Locust Creek | Walleye, Smallmouth bass |
| Cameron City Lake #3 | Grindstone Creek | Hybrid striped bass |
| Big Creek | Big Creek | Spotted bass |
| Grindstone Creek | Grindstone Creek | Spotted bass |
| Sugar Creek | Sugar Creek | Spotted bass |
| Shoal Creek | Upper Shoal Creek | Spotted bass |
| Locust Creek | Near Jo Shelby Lake | Largemouth bass |

Table 14. Estimated number of various fish species captured by anglers from the upper and lower Grand River from January 12, 1975 to January 10, 1976 (Fleener 1977).

| Species | Lower Grand | Upper Grand | Total |
|------------------|-------------|-------------|---------|
| Bullheads | *47,850 | | 47,850 |
| Carp | 21,080 | 4,010 | 25,090 |
| Channel catfish | 11,240 | 11,170 | 22,410 |
| Crappie | 2,820 | | 2,820 |
| Buffalo | 2,240 | 40 | 2,280 |
| Flathead catfish | 1,840 | 820 | 2,660 |
| Freshwater drum | 850 | 340 | 1,190 |
| American eel | 320 | | 320 |
| Bluegill | 210 | | 210 |
| Sucker sp. | 60 | | 60 |
| Largemouth bass | 20 | | 20 |
| Other spp. | 480 | 530 | 1010 |
| Total Fish | 89,010 | 16,910 | 105,920 |
| Total Hours | 198,680 | 69,250 | 267,930 |
| Fish per Hour | 0.45 | 0.24 | 0.40 |
| Total Anglers | 34,510 | 23,640 | 58,150 |

^{*} A majority of the bullheads were caught in a 300-acre pool at Fountain Grove C.A.